REMARKS/ARGUMENTS

This response is filed further to the Office Action response filed on December 18, 2007. Applicant respectfully requests that the Examiner consider the contents of both responses upon further examination of the application.

The information in this supplemental response includes further emphasis regarding the improper combination of references Feuerstein et al. and Lundby et al., further arguments regarding some of the independent claims, and specific responses to the Examiner's responses to Applicant's arguments submitted in the Office Action filed on May 8, 2007.

Status of Claims

Claims 1 to 49 remain in the application.

35 U.S.C. 103 Rejections

The law on obviousness under 35 U.S.C. 103 was recently addressed in ***KSR Int'l v. Teleflex, Inc.***, *No. 04-1350, slip op. at 14 (U.S., Apr. 30, 2007)*. Following this, examination guidelines were released by the USPTO on October 10, 2007 in regards to determining obviousness under 35 U.S.C. 103. According to these guidelines, the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 is stated in ***Graham v. John Deere Co.*** *383 U.S. 1,148 USPQ 459 (1966)*. Obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the Court are as follows:

(1) Determining the scope and content of the prior art;

(2) Ascertaining the differences between the claimed invention and the prior art; and

(3) Resolving the level of ordinary skill in the pertinent art.

The Graham factors, including secondary considerations when present, are the controlling inquiries in any obviousness analysis. Once the findings of fact are articulated, Office personnel must provide an explanation to support an obviousness rejection under 35 U.S.C. 103.

According to **KSR**, for the Patent Office to properly combine references in support of an obviousness rejection, the Patent Office must identify a reason why a person of ordinary skill in the art would have sought to combine the respective teachings of the applied references.

Applicant's analysis below demonstrates that the Examiner has failed to properly conform to the aforementioned guidelines for a finding of obviousness under 35 U.S.C. 103.

The Examiner has rejected claims 1, 6, 7, 10, 11, 13, 31, 32, 36 and 48 under 35 U.S.C. 103(a) as being unpatentable over Feuerstein et al. (U.S. Patent No. 6,178,333) in view of Lundby et al. (U.S. Patent No. 6,356,528).

Missing Elements

The following is a discussion of why the cited references do not disclose all the elements of the rejected claim. While it may be considered that "the mere existence of differences between prior art and an invention does not establish the invention's non-obviousness", Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one skilled in the art (Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR international Co.* v. *Teleflex Inc.*, published in Federal Register Vol. 72, No. 195 October 10, 2007). As such, if elements from a claim are not disclosed by the combination of cited references and no valid reasoning is provided why the missing elements would be obvious, this may provide a strong basis for why a claim should not be rejected based on obviousness.

With regard to claim 1, the Examiner argues that Feuerstein et al. discloses:

> "the N transmit signals collectively comprise a plurality N of main signals (Fig. 6, elements α, β, γ) and a plurality of delayed main signals each delayed main signal being a delayed version of one of the main signals (Fig. 6, outputs of elements 621, 622, 623; column 7, lines 15-40; wherein the delayed signals are the outputs of the delay elements 621, 622, 623 that are fed to elements 651, 652, 662 to produce the beams 1, 2 ... 12), wherein each transmit signal comprises a combination of only a respective main signal of the plurality of N

main signals and at least one respective delayed main signal of the plurality of delayed main signals (Fig. 6, elements 651, 652, 662 outputs; column 7, lines 1-56, wherein the outputs are obtained by combining the main signal with the delayed signals, the combination being provided by the switch matrices whose weights can be adjusted to give only one main signal per beam).", emphasis added.

In order to clarify the comments submitted in the original response filed on December 18, 2007, Applicant submits that the above paragraph does not specifically refer to "N transmit antennas". However, the Examiner has indicated in the Responses to Arguments section at the top of page 4 of the current Office Action that once the delaying and weighting of Feuerstein et al. is performed, the signals could be fed to the multiple antennas of Lundby et al. instead of the "antenna elements" of Feuerstein et al.. Applicant submits that a simplistic view such as that proposed by the Examiner would not result in the claimed invention.

Applicant submits that the above limitation must be considered with respect to the limitation "N transmit antennas, where N>=2, each transmit antenna for transmitting a respective one of N transmit signals to a common receiver" (emphasis added) which is also recited in the claim. Feuerstein et al. discloses "a system and method for avoiding destructive combining of signals simulcast over multiple antenna beams. Preferably, the antenna beams are contiguous, substantially non-overlapping, narrow antenna beams". Therefore, Feuerstein et al. does not disclose a system in which N transmit signals are transmitted from each one of N respective antennas to a common receiver because the antenna beams are substantially non-overlapping to avoid destructive combining. Clearly, Feuerstein et al. teaches away from the scope of claim 1. This issue will be discussed in greater detail in the "Reasons to Combine" section below.

Furthermore, Applicant submits that with regard to the limitation "wherein each transmit signal comprises a combination of only one respective main signal of the plurality N of main signals and at least one respective delayed main signal of the plurality of delayed main signals" (emphasis added), the limitation defines that each transmit signal comprises only one respective main signal. In addition, the term "collectively" as recited in claim 1, denotes that all of the N transmit signals together (each of which correspond to the N signals in parallel) contain the

plurality N of main signals and the plurality of delayed main signals. Therefore, since each transmit antenna transmits only one main signal, and collectively they transmit all the main signals, each antenna must transmit a different one of the N main signals.

The Examiner has alleged that Feuerstein et al. discloses this limitation, that is, the N transmit signals collectively comprising a plurality N of main signals, in the form of elements α, β, γ of Fig. 6 of Feuerstein et al. Furthermore, in the Fig. 6, there are 12 output beams identified. Therefore, at least one of α, β, γ must appear in more than one beam and in the typical examples disclosed in Feuerstein et al. each appears four times. This is more than "only one main signal" being transmitted per "transmit signal".

If the Examiner were to suggest that the number of beams could be reduced to only three, such that only a single one of α, β, γ is transmitted per transmit beam, Applicant submits that this would represent a situation where each beam corresponds to a 120° section of a total 360° coverage area. This teaches away from the fundamental result disclosed by Feuerstein et al. as will be described in further detail below in the "Reasons to Combine" section. In addition, since the twelve beams of Fig, 6 cover a 360° coverage area, a reduced number of three beams would similarly cover the same area. Clearly, using three beams that are not intended to overlap so as to avoid nulls in a composite radiation pattern synthesized from a plurality of antenna beams (abstract), would not result in the transmissions being received by a common receiver, as recited in claim 1.

Reason to Combine

Once the scope of the prior art is ascertained, the content of the prior art must be properly combined. An obviousness inquiry requires review of a number of factors, including the background knowledge possessed by a person having ordinary skill in the art, to determine whether there was an apparent reason to combine the elements of the prior art in the fashion claimed by the present invention. For the Patent Office to combine references in support of an obviousness rejection, the Patent Office must identify a reason why a person of ordinary skill in the art would have combined the references ***KSR Int'l v. Teleflex, Inc.***, *No. 04-1350, slip op. at 14 (U.S., Apr. 30, 2007)*, Id. at 15. Even if the Patent Office is able to articulate and support a

suggestion to combine the references, it is impermissible to pick and choose elements from the prior art while using the application as a template.

Applicant submits that there is no suggestion of a desirability of the claimed invention in the references that would serve as a reason for one skilled in the art to combine the references.

Feuerstein et al. discloses a system and method for avoiding nulls in a composite radiation pattern synthesized from a plurality of antenna beams. Feuerstein et al. discloses the use of delays in signal paths for each beam of a plurality of antenna beams utilized to synthesize the desired radiation pattern in order to avoid destructive combining of the beams. (Abstract). Furthermore, in the Technical Field of the Invention, the patent is described as being related to "the simulcasting of signals from a multibeam antenna system and, more particularly, to systems and methods for delaying signals simulcast from various multibeams to avoid destructive nulls" (emphasis added). Feuerstein et al. is directed to transmitting multiple beams from each of one or more transmitting antennas (the one or more transmitting antennas providing up to 360 degrees of coverage), such that the individual multiple beams do not substantially overlap. If they overlap, then there is potential for destructive combining of the beams. Therefore, one skilled in the art would not consider the subject matter of Feuerstein et al. when considering a manner of transmitting N transmit signals from each of a respective N transmit antennas to a common receiver, as recited in claim 1 of the present application. Such an action is contrary to the teaching of Feuerstein et al. as multiple beams transmitted to a common receiver would result in destructive combining of the beams, which is a primary result that Feuerstein et al. is trying to avoid.

The Examiner alleges that Lundby et al. discloses "N transmit antennas, where N>=2, each transmit antenna for transmitting a respective one of N transmit signals to a common receiver" in Figure 1 of Lundby et al. Applicant submits that, for the reasons discussed above, N transmit antennas each transmitting a respective one of N transmit signals to a common receiver, teaches away what is disclosed in Feuerstein et al. Each beam generated by Feuerstein et al., for example the outputs of switch matrices 652-662 in Figure 6 of Feuerstein et al., is intended as one beam of a plurality of non-overlapping beams. Applying those beams to antennas that would transmit to a common receiver would contradict the solution for the fundamental problem

addressed by Feuerstein et al. Applicant again reiterates that it is not reasonably to expect one skilled in the art to combine two references that teach away from one another, and as such the references should not be combined in an obviousness rejection of claim 1.

Applicant submits that the Examiner has combined elements from separate references taken out of their context of intended use. Applicant submits that one skilled in the art would not combine the subject matter of the two references when viewed in their overall respective context. Applicant submits that the Examiner has not provided a sufficient reason for combining the references in view of the above remarks. Applicant submits that the Examiner is merely combining elements in hindsight that appear in isolation to disclose the elements of the claimed invention.

In summary, it is respectfully submitted that for the most part, the references cited by the Examiner in the combination used to reject claim 1 do not teach the claimed elements as alleged by the Examiner, and the Examiner has failed to provide a valid reason for combining the references as required by the recent decision in **KSR**. As such, the Examiner is respectfully requested to withdraw the 35 U.S.C. 103 rejection of claim 1.

Amended claim 6 recites similar subject matter to claim 1, except that the claim is limited to transmitting a first main signal and a second main signal. The amended claim recites that the first linear combination and the second linear combination collectively transmit all of the first and second main signals and corresponding first and second delays versions of the first and second main signals. Applicant submits that claim 6 patentably distinguishes over the combination of Feuerstein et al. and Lundby et al. for at least the same reasons discussed above with regard to the rejection of claim 1.

Claims 7, 10, 11 and 13 are dependent on claim 6, either directly or indirectly, and are allowable for at least their dependence upon claim 6.

Claims 31, 32 and 36 are dependent on claim 1, either directly or indirectly, and are allowable for at least their dependence upon claim 1.

Amended claim 48 recites similar subject matter to amended claim 1 in the form of a method. Applicant submits that claim 6 patentably distinguishes over the combination of Feuerstein et al. and Lundby et al. for at least the same reasons discussed above with regard to the rejection of claim 1.

Applicant respectfully requests that the Examiner reconsider and withdraw the obviousness rejection of claims 1, 6, 7, 10, 11, 13, 31, 32, 36 and 48.

Claim 26-30, 43, 46 and 47

The Examiner has rejected claims 26-30, 43, 46 and 47 under 35 U.S.C. 103(a) as being unpatentable over Feuerstein et al., Lundby et al., McGuffin, and U.S. Patent Application Publication No. 20030080890 (Hilton).

Claim 26 of the present application recites:

> at least one receive antenna, each receive antenna receiving a respective receive signal over the wireless channel from the transmitter;
>
> for each receive antenna, a respective over-sampling analog to digital converter which samples the respective receive signal and a respective sample selector adapted to produce a respective plurality of sample streams;
>
> signal processing circuitry adapted to perform receive processing for each of the sample streams to produce pre-combined signals;
>
> a MIMO (Multiple Input Multiple Output) decoder adapted to perform MIMO processing on the pre-combined signals. (emphasis added)

Missing Elements

It is alleged that McGuffin discloses "signal processing circuitry adapted to perform receive processing for each of the sample streams to produce pre-combined signals" in the form of reference characters 6a-m (mixer), 10a-m (IF amp) and 11a-m (synchronous detector). These elements only serve to down convert, amplify and synchronously detect a signal received on

each respective antenna 2a-m. Applicant submits that elements 6a-m, 10a-m and 11a-m of McGuffin do not produce "pre-combined signals" in the manner recited in claim 26.

For at least the above reason, Applicant submits that the combination of Feuerstein et al., Lundby et al., McGuffin, and Hilton do not teach all the limitations of claim 26. The Examiner has also not provided a satisfactory explanation of why such missing limitations would be considered to be obvious.

Reason to Combine

Independent claim 26 is a claim directed to a receiver for receiving and processing a signal of similar type to that transmitted by the transmitter of claim 1. The Examiner has again combined Feuerstein et al. and Lundby et al. to allege such a transmitted signal is obvious. For at least the reasons discussed above with regard to the rejection of claim 1, Applicant submits this is not a valid combination for disclosing such a transmitted signal.

Furthermore, Applicant submits that the Examiner has selected each of the particular limitations recited in claim 26 from multiple references in hindsight, without concern for the particular context of the disclosed subject matter in the respective references and how the particular limitation is disclosed in that context versus how the particular limitation would be used in the context of the claimed invention. When a claim is read in its entirety, the claim typically has a particular set of inter-dependent limitations. The manner in which the individual references cited by the Examiner have been combined does not allow for proper interdependence of the limitations. The Examiner has simply combined an aggregate collection of independent limitations. Applicant submits that little consideration has been given to whether someone skilled in the art would realistically consider combining the subject matter and whether they could actually combine the subject matter in the manner alleged. The combination of references in hindsight is not appropriate when rejecting claims in an obviousness rejection.

In summary, it is respectfully submitted that for the most part, the references cited by the Examiner in the combination used to reject claim 26 do not teach the claimed elements as alleged by the Examiner, and the Examiner has failed to provide a valid reason for combining the references. As such, the Examiner is respectfully requested to withdraw the 35 U.S.C. 103 rejection of claim 26.

Claims 27 to 30 are dependent upon claim 26, either directly or indirectly. For at least their dependence upon claim 26, Applicant submits that claims 27 to 30 patentably distinguish over the cited references.

Claim 43 recites similar limitations to claim 26 and is dependent upon claim 1, via system claim 31. Claims 46 and 47 are dependent indirectly on claim 1. As Feuerstein et al. teaches away from the claimed invention as discussed above, especially with regard to Lundby et al., Applicant submits that it is improper to combine Feuerstein et al., Lundby et al., McGuffin and Hilton in the manner alleged by the Examiner. Applicant submits that claims 43, 46 and 47 patentably distinguish over the combination of Feuerstein et al., Lundby et al. McGuffin and Hilton.

Applicant respectfully requests that the Examiner reconsider and withdraw the obviousness rejection to claims 26-30, 43, 46 and 47.

Claim 26

The Examiner has rejected independent claim 26 under 35 U.S.C. 103(a) as being unpatentable over Feuerstein et al., Lundby et al., McGuffin, U.S. Patent Application Publication No. 20030080890 (Hilton) and European Patent 1313246 (Rudrapatna et al.).

The Examiner uses the same arguments for each of the references as cited in the rejection of claim 26 above, except that the Examiner in the current rejection of claim 26 alleges that Rudrapatna et al. discloses a MIMO decoder, instead of alleging that Lundby et al. discloses the MIMO decoder.

For similar reasons discussed above with regard to the other rejection of claim 26 ("Missing Elements" and "Reasons to Combine"), Applicant submits that claim 26 patentably distinguishes over the cited references.

Furthermore, Applicant submits that Rudrapatna et al. does not teach the limitations it is alleged to disclose. Rudrapatna et al. discloses a MIMO decoder receiving T data streams from T receive antennas and decodes the T data streams into the N encoded data streams. Each of N decoders receives a respective one of the N encoded streams from the MIMO decoder and the N decoders produce N decoded streams.

Claim 26 recites that a sample selector produces a plurality of sample streams from the receive signal received from each of the at least one receive signal. These plurality of sample streams are processed by the signal processing circuitry to produce "pre-combined signals". A MIMO decoder performs MIMO processing on the "pre-combined signals". Rudrapatna et al. discloses performing MIMO processing on T data streams from T receive antennas. There is no suggestion or disclosure of the T data streams being "pre-combined signals", Rudrapatna et al. discloses processing a single data stream from each of T antennas (Figure 2 of Rudrapatna et al.).

For at least the above reasons discussed above, Applicant submits that the combination of Feuerstein et al., Lundby et al., McGuffin, Hilton and Rudrapatna et al. do not teach all the limitations of claim 26. The Examiner has also not provided a satisfactory explanation of why such a limitation would be considered to be obvious.

Applicant respectfully requests that the Examiner reconsider and withdraw the obviousness rejection to claim 26.

Claims 2-5, 8, 9, 12, 14-25, 27, 33-35, 37-42, 44, 45 and 49

As indicated in the initial response submitted on December 18, 2007, the remainder of the rejected claims rely on the combination of Feuerstein et al. and Lundby et al. Thus, on the basis of the discussion above, the Examiner is respectfully requested to withdraw all of the 35 U.S.C. 103(a) rejections of the claims.

Applicant 's Responses to Examiner's Responses on pages 2-5 of the Current Office Action

Page 2 – The Examiner submits that Feuerstein et al. discloses "each antenna has only one main signal".

The Examiner argues that the weights in the switch matrices 651, 652, etc. in Figure 6 of Feuerstein et al. can be appropriately selected such that each beam only receives one main signal. That would defeat the purpose of routing each main signal to each of the switching matrices. Why would the implementers of Feuerstein et al. bother implementing the splitters 631, 632, 633 to route each main signal to each switch matrix only to set the weight to zero on all but one of the switch matrices? It is respectfully submitted that a person skilled in the art would not contemplate setting the weights in that manner as such would defeat the purpose of

Feuerstein et al. More specifically, Feuerstein et al. specifically teaches away from setting the weights to zero.

Page 3 – The Examiner alleges that "signal delaying and weighting can be done using Feuerstein method and the beam signals fed to the transmit antennas of Lundby".

For at least the reasons discussed in detail above, Applicant submits that one skilled in the art would not consider combining the subject matter of Feuerstein et al. and Lundby et al.

Page 3 – The Examiner alleges that Feuerstein et al. discloses a linear combination of main and delayed signals.

Applicant submits that that even if Feuerstein et al. discloses a linear combination of main and delayed signals, Feuerstein et al. and Lundby et al. do not disclose all the limitations of claim 6 for at least the reasons discussed above in response to the objection to claim 6.

Page 3 – The Examiner disagrees with Applicants argument that Feuerstein et al. teaches away from the invention, as presented in the previous Office Action Response.

The Examiner alleges that "one skilled in the art can easily use Feuerstein et al.'s weighting method to obtain beams 1, 2, ... and then feed those to the multiple antennas in Lundby's system". For at least the reasons discussed above with regard to the objections to claim 1, Applicant submits that the Examiner has failed to establish a proper case for an obviousness rejection in view of the recent **KSR** decision based on the combination of the two cited references.

Page 4 – The Examiner alleges that the combination of Lundby et al. and Feuerstein et al. together disclose N transmit signals collectively transmitting all the main signals and the delayed signal.

Applicant submits that the paragraph being discussed to by the Examiner pertains to Applicant arguing that Lundby et al. alone did not disclose N transmit signals collectively contain a plurality of N main signals and a plurality of delayed main signals", not the combination of Feuerstein et al. and Lundby et al. However, regardless of this fact, Applicant

submits that the claims of the present application are non-obvious and patentably distinguish over the combination of the two cited references for at least the reasons discussed above.

In view of the foregoing, early favourable consideration of this application is earnestly solicited.

Respectfully submitted,

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